

**NORTH CAROLINA DIVISION OF
AIR QUALITY**

Application Review

Issue Date: xx/xx/2020

Region: Wilmington Regional Office
County: New Hanover
NC Facility ID: 6500343
Inspector's Name: Linda Willis
Date of Last Inspection: 11/13/2019
Compliance Code: 3 / Compliance - inspection

<p align="center">Facility Data</p> <p>Applicant (Facility's Name): New Hanover County Secure Landfill</p> <p>Facility Address: New Hanover County Secure Landfill 5210 U.S. Highway 421 North Wilmington, NC 28401</p> <p>SIC: 4953 / Refuse Systems NAICS: 562212 / Solid Waste Landfill</p> <p>Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V</p>				<p align="center">Permit Applicability (this application only)</p> <p>SIP: 15A NCAC 02D .0516, .0521, .0524, .1100, 02Q .0504, .0711 NSPS: Subpart XXX NESHAP: N/A PSD: N/A PSD Avoidance: N/A NC Toxics: Modeled emission rates for acrylonitrile, benzene, hydrogen chloride, hydrogen sulfide, and vinyl chloride. 112(r): N/A Other: N/A</p>																																																			
<p align="center">Contact Data</p> <table border="1"> <tr> <th align="center">Facility Contact</th> <th align="center">Authorized Contact</th> <th align="center">Technical Contact</th> </tr> <tr> <td>Andrew Mulvey Environmental Specialist (910) 798-4453 3002 U.S. Highway 421 North Wilmington, NC 28401</td> <td>Joe Suleyman Director - Dept. of Env. Management (910) 798-4409 3002 U.S. Highway 421 North Wilmington, NC 28401</td> <td>Andrew Mulvey Environmental Specialist (910) 798-4453 3002 U.S. Highway 421 North Wilmington, NC 28401</td> </tr> </table>				Facility Contact	Authorized Contact	Technical Contact	Andrew Mulvey Environmental Specialist (910) 798-4453 3002 U.S. Highway 421 North Wilmington, NC 28401	Joe Suleyman Director - Dept. of Env. Management (910) 798-4409 3002 U.S. Highway 421 North Wilmington, NC 28401	Andrew Mulvey Environmental Specialist (910) 798-4453 3002 U.S. Highway 421 North Wilmington, NC 28401	<p align="center">Application Data</p> <p>Application Number: 6500343.20A Date Received: 12/20/2019 Application Type: Modification Application Schedule: TV-Sign-501(b)(2) Part II</p> <p align="center">Existing Permit Data</p> <p>Existing Permit Number: 09805/T06 Existing Permit Issue Date: 03/07/2019 Existing Permit Expiration Date: 11/30/2023</p>																																													
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<p>Total Actual emissions in TONS/YEAR:</p> <table border="1"> <thead> <tr> <th align="center">CY</th> <th align="center">SO2</th> <th align="center">NOX</th> <th align="center">VOC</th> <th align="center">CO</th> <th align="center">PM10</th> <th align="center">Total HAP</th> <th align="center">Largest HAP</th> </tr> </thead> <tbody> <tr> <td align="center">2018</td> <td align="center">0.5200</td> <td align="center">1.66</td> <td align="center">11.47</td> <td align="center">6.74</td> <td align="center">0.2000</td> <td align="center">5.62</td> <td align="center">1.87 [Toluene]</td> </tr> <tr> <td align="center">2017</td> <td align="center">0.3700</td> <td align="center">1.39</td> <td align="center">8.66</td> <td align="center">5.89</td> <td align="center">0.1000</td> <td align="center">4.99</td> <td align="center">1.75 [Toluene]</td> </tr> <tr> <td align="center">2016</td> <td align="center">0.3700</td> <td align="center">1.39</td> <td align="center">9.98</td> <td align="center">5.89</td> <td align="center">0.1000</td> <td align="center">4.73</td> <td align="center">1.65 [Toluene]</td> </tr> <tr> <td align="center">2015</td> <td align="center">0.6300</td> <td align="center">2.37</td> <td align="center">9.53</td> <td align="center">10.05</td> <td align="center">0.1000</td> <td align="center">5.73</td> <td align="center">1.96 [Toluene]</td> </tr> <tr> <td align="center">2014</td> <td align="center">---</td> <td align="center">---</td> <td align="center">9.15</td> <td align="center">---</td> <td align="center">0.1600</td> <td align="center">5.02</td> <td align="center">1.87 [Toluene]</td> </tr> </tbody> </table>								CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP	2018	0.5200	1.66	11.47	6.74	0.2000	5.62	1.87 [Toluene]	2017	0.3700	1.39	8.66	5.89	0.1000	4.99	1.75 [Toluene]	2016	0.3700	1.39	9.98	5.89	0.1000	4.73	1.65 [Toluene]	2015	0.6300	2.37	9.53	10.05	0.1000	5.73	1.96 [Toluene]	2014	---	---	9.15	---	0.1600	5.02	1.87 [Toluene]
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<p>Review Engineer: Joshua L. Harris</p> <p>Review Engineer's Signature: _____ Date: _____</p>					<p align="center">Comments / Recommendations:</p> <p>Issue 09805/T07 Permit Issue Date: xx/xx/2020 Permit Expiration Date: 11/30/2023</p>																																																		

1. Purpose of Application

The New Hanover County Secure Landfill is an active Municipal Solid Waste (MSW) landfill located in Wilmington, New Hanover County. The landfill has submitted Application No. 6500343.20A, which is the second part of a two-step Significant Modification of their Title V Air permit for the installation of a landfill gas collection and control system (GCCS) and utility flare. The complete application was received on December 20, 2019 and will go through the 30-day public notice and 45-day EPA review periods prior to issuance.

The facility contact for this application is Joe Suleyman, Director, Department of Environmental Management, (phone: 910-798-4403). A consultant, SCS Engineers, P.C., was used for the application preparation. The contact at SCS Engineers is David Greene, Project Manager, (phone: 828-285-8953).

2. Facility Description

This facility is an active Municipal Solid Waste Landfill owned and operated by New Hanover County. The landfill began operating in 1981 and has a permitted design capacity in excess of 2.5 million Mg and 2.5 million m³. Gases generated during the decomposition of the waste will be collected via an installed landfill gas collection system and routed to a 2,500 scfm utility flare for incineration. The NC Division of Waste Management, Solid Waste Section (SWS) issued the latest revision of permit No. 65-04 on December 21, 2017, to expand design capacity by adding 9 additional Cells to the existing 6 and triggering the modification provision of NSPS XXX (§60.760 and §60.761). The permit-to-construct authorized the construction of Cells 7-13, and construction was commenced on May 5, 2018, triggering applicability of NSPS Subpart XXX.

The landfill previously accepted asbestos-containing waste, which was placed in Cell 5, but no longer actively accepts asbestos-containing waste, and now directs such wastes to the Sampson County Landfill. The landfill uses a reverse osmosis (RO) system to treat leachate collected from the landfill prior to discharge to the Northeast Cape Fear River. Concentrated residuals from the RO system are injected into the landfill via subsurface wells. Excess leachate that is not treated by the RO system is trucked to the county's wastewater treatment plants.

3. Application Chronology

- 03/07/19 Air Quality Permit Revision No. 09805T06 was issued as Part 1 of a two-step Significant Modification to install a GCCS and utility flare. The permit included a condition to submit the second part application within 12 months of start-up.
- 05/15/19 Utility flare (ID No. CD-1) was started-up.
- 05/31/19 The facility submitted the start-up notification for CD-1 to the WiRO.
- 12/20/19 The Division of Air Quality (DAQ), Wilmington Regional Office (WiRO), received Application No. 6500343.20A, which was submitted for a Significant Modification (Part II), and forwarded copies to the Raleigh Central Office (RCO). The application contained the required forms, the \$970 application fee, and there was no request for confidentiality. The application appeared to be complete for processing.
- 01/07/20 RCO sent the facility a letter acknowledging receipt of the complete application.

- 01/23/20 Joshua Harris sent electronic copies of the draft permit and review documents to Booker Pullen and Brad Newland for comments.
- 01/28/20 Booker Pullen responded with minor editorial comments.
- 01/31/20 Linda Willis responded, stating that WiRO had no comments.
- 02/03/20 Joshua Harris sent electronic copies of the draft permit and review documents to Joe Suleyman, Andrew Mulvey, and David Greene for comments.
- 02/18/20 Joshua Harris sent a follow-up email to Joe Suleyman, Andrew Mulvey, and David Greene. Mr. Harris requested that the facility provide any comments on the draft documents by February 21, 2020.
- 02/19/20 David Greene contacted Joshua Harris by phone and stated that the landfill did not have any comments on the draft documents.
- Xx/xx/20 30-day public notice and 45-day EPA review periods begin.
- Xx/xx/20 Public notice period ends; [comments received].
- Xx/xx/20 EPA review period ends; [comments received].
- Xx/xx/20 Air Quality Permit Revision No. 09805T07 issued.

4. Table of Changes to Existing Permit No. 09805T07

Page No.	Section	Description of Changes
Cover and Throughout	Cover and Throughout	<ul style="list-style-type: none"> Updated permit revision numbers and dates throughout. Updated PSD increment tracking statement.
2	Contents	Included Section 2.2.
	1 Table	Removed table note as it is no longer applicable.
9	2.1 A.3.i.i.	Inserted requirement for an initial performance test of the flare within 180 days of the compliance date as listed in Section A.3.b.ii.
10	2.1 A.3.n.i.-iv.	Inserted alternative operating parameters and procedures approved by DAQ as part of the previously submitted Design Plan.
13	2.1 A.3.x.x.	Specified the timeframe for submittal of the initial annual report and performance test report as being within 180 days of the compliance date listed in Section A.3.b.ii.
15	2.1 A.5.a.	Updated permit condition to include the latest permitting language regarding air toxics compliance demonstrations.
----	2.1 A.7.	Removed permit condition for 15A NCAC 02Q .0504.
17	2.2 A.	Included permit shield for MACT AAAA.

5. Changes in Equipment

There are no changes to the facility's permitted emission sources or to insignificant/exempt activities as a result of this permit application. All modifications to emissions sources and control devices were made as part of the Part I permit application, No. 6500343.18C.

The facility's permitted emission sources are as follows:

Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-1 NSPS XXX	One municipal solid waste landfill	CD-GCCS CD-1	Landfill Gas Collection System, and One landfill gas-fired utility flare (2,500 standard cubic feet per minute maximum flow rate; 75.9 million Btu per hour heat input at 506 Btu per cubic foot heat value of LFG)

The facility's insignificant/exempt activities are as follows:

Emission Source ID No.	Emission Source Description
IES-Leachate Pond	Leachate holding pond
IES-Aeration Tank	Aeration tank
IES-Diesel Tank	Diesel storage tank
IES-Waste Oil	Waste oil storage tank
IES-Ash Silo	Mobile ash silo for alternative daily cover
IES-EG1 GACT ZZZZ, NSPS JJJJ	Propane-fired, spark ignition emergency generator (20 kW, 27 HP)

6. NSPS, NESHAP, PSD, 112(r), CAM & Attainment Status

- NSPS –

- ✓ The MSW landfill (ID No. ES-1) is subject to 40 CFR 60, Subpart XXX “Municipal Solid Waste Landfills that Commenced Construction, Reconstruction, or Modification After July 17, 2014,” since the landfill commenced construction on a modification on May 1, 2018.
- ✓ The MSW landfill (ID No. ES-1) is NOT subject to 40 CFR 60, Subpart WWW “Municipal Solid Waste Landfills.” The landfill is subject to NSPS Subpart XXX, which supersedes Subpart WWW.
- ✓ The emergency generator (ID No. IES-EG1), is subject to 40 CFR 60, Subpart JJJJ, “Stationary Spark Ignition Internal Combustion Engines,” since the engine is a spark ignition emergency engine, manufactured after January 1, 2009.

- **NESHAP –**

- ✓ The MSW landfill (ID No. ES-1) is NOT subject to 40 CFR 63, Subpart AAAA “Municipal Solid Waste Landfills.” Although the landfill’s design capacity exceeds the 2.5 million Mg and 2.5 million m³ thresholds, the uncontrolled NMOC emission rate, determined using the Tier 2 methodology, is less than 50 Mg/yr. Additionally, the landfill is not, nor is it collocated with, a major source of HAPs.

Since the landfill is subject to NSPS Subpart XXX and is required to install a GCCS because the NMOC emission rate is greater than the XXX threshold of 34 Mg/yr, the facility is not required to continue evaluating the NMOC emission rate. Previous Tier 2 results, shown below, indicate that the NMOC emission rate will potentially exceed the 50 Mg/yr threshold by the end of CY2023 and make the landfill subject to MACT AAAA.

Year	NMOC Emission Rate ¹ (Mg/yr)	NSPS XXX Threshold (Mg/yr)	GCCS Required? ²
2018	41.3	34	YES
2019	43.5	34	YES
2020	45.5	34	YES
2021	47.6	34	YES
2022	49.6	34	YES
2023	51.7	34	YES

1. NMOC emission rates listed for years 2020 through 2023 are extrapolated values using prior testing as a basis.
2. NSPS Subpart XXX was triggered in 2018. Prior to 2018, the landfill was subject to NSPS Subpart WWW and was not required to install a GCCS.

Since the facility is no longer required to conduct NMOC testing for compliance with NSPS XXX, it is difficult to know exactly when the landfill will reach the 50 Mg/yr NMOC emission rate threshold. Additionally, since the permit does not contain requirements for such testing, a permit shield is being included to state that the landfill is not subject to MACT AAAA as long as the NMOC emission rate is below 50 Mg/yr.

- ✓ The MSW landfill (ID No. ES-1) is NOT subject to 40 CFR 61 Subpart M, “National Emission Standard for Asbestos,” since it is not an active waste disposal site. The landfill previously accepted asbestos waste but has since ceased.
- ✓ The emergency generator (ID No. IES-EG1) is subject to 40 CFR 63, Subpart ZZZZ, “Stationary Reciprocating Internal Combustion Engines,” and is considered as a “new” emergency engine under this regulation. The facility complies with the requirements of 40 CFR 63, Subpart ZZZZ by complying with the requirements of 40 CFR 60, Subpart JJJJ.

- **PSD** – The facility’s potential emissions of criteria pollutants do not exceed PSD permitting thresholds.
- ✓ New Hanover County has triggered increment tracking under PSD for PM₁₀, SO₂, and NO_x. The increment changes associated with the flare were addressed in the Part I permit application.

In the review for Revision T06, the 20-kW emergency generator (ID No. IES-EG1) was included as an insignificant activity. The emissions estimations were erroneously low due to a unit conversion error. The emission calculations for that engine have been corrected, and example calculations are included below. No increment changes were made previously due to the error, however upon correction of the emission rate calculation, the NO_x emission rates can no longer be considered negligible.

The following increments are consumed as a result of this correction:

Pollutant	Emission Rate of IES-EG1
NO _x	0.22 lb/hr

The emission rates of PM₁₀ and SO₂ are less than 1/100th of one pound per hour for this source and are not reported.

The following emission factors from AP-42 Chapter 3.2 were used:

PM = 4.831 x 10⁻² lb/mmBtu (all particulate matter is assumed to be as PM_{2.5})

SO₂ = 5.88 x 10⁻⁴ lb/mmBtu

NO_x = 3.17 lb/mmBtu

$$20 \text{ kW} \times \frac{0.9486 \text{ Btu}}{\text{kW} - \text{second}} \times \frac{1 \text{ mmBtu}}{1 \times 10^6 \text{ Btu}} \times \frac{4.831 \times 10^{-2} \text{ lb PM}_{10}}{\text{mmBtu}} \times 3600 \frac{\text{seconds}}{\text{hour}} = 3.30 \times 10^{-3} \frac{\text{lb PM}_{10}}{\text{hour}}$$

$$20 \text{ kW} \times \frac{0.9486 \text{ Btu}}{\text{kW} - \text{second}} \times \frac{1 \text{ mmBtu}}{1 \times 10^6 \text{ Btu}} \times \frac{5.88 \times 10^{-4} \text{ lb SO}_2}{\text{mmBtu}} \times 3600 \frac{\text{seconds}}{\text{hour}} = 4.02 \times 10^{-5} \frac{\text{lb SO}_2}{\text{hour}}$$

$$20 \text{ kW} \times \frac{0.9486 \text{ Btu}}{\text{kW} - \text{second}} \times \frac{1 \text{ mmBtu}}{1 \times 10^6 \text{ Btu}} \times \frac{3.17 \text{ lb NO}_x}{\text{mmBtu}} \times 3600 \frac{\text{seconds}}{\text{hour}} = 0.22 \frac{\text{lb NO}_x}{\text{hour}}$$

- **112(r)** – The facility does not store any of the listed 112(r) chemicals in amounts that exceed the threshold quantities. Therefore, it is not required to maintain a written Risk Management Plan (RMP).
- **CAM** – CAM does not apply to this facility since it is subject to NSPS regulations that were proposed after 1990.
- **Attainment status** – New Hanover County is in attainment for all criteria pollutants.

7. Regulatory Review

The facility is subject to the following air quality regulations in addition to the General Conditions:

- 15A NCAC 02D .0516: Sulfur Dioxide Emissions from Combustion Sources
- 15A NCAC 02D .0521: Control of Visible Emissions
- 15A NCAC 02D .0524: New Source Performance Standards, 40 CFR 60, Subpart XXX
- 15A NCAC 02D .1100: Control of Toxic Air Pollutants
- 15A NCAC 02D .1806: Control and Prohibition of Odorous Emissions
- 15A NCAC 02Q .0711: Emission Rates Requiring a Permit

The following condition is being removed as a result of this permit modification:

- 15A NCAC 02Q .0504: Option for Obtaining a Construction and Operation Permit

15A NCAC 02D .0516: Sulfur Dioxide Emissions from Combustion Sources

SO₂ emissions from combustion sources are limited to 2.3 pounds per million Btu heat input. LFG combustion in the utility flare (ID No. CD-1) emits 4.79 lb SO₂/hr, at the maximum heat input rate of 75.9 mmBtu/hr, which equals 0.063 lb SO₂/mmBtu. No monitoring, recordkeeping or reporting is required for LFG combustion. Compliance is expected.

15A NCAC 02D .0521: Control of Visible Emissions

Visible emissions from the utility flare (ID No. CD-1) are limited to a six-minute average opacity of 20%. Visible emissions from a properly maintained and operated flare are commonly not a concern. No monitoring, recordkeeping or reporting is required for LFG combustion. Compliance is expected.

15A NCAC 02D .0524: New Source Performance Standards, 40 CFR 60, Subpart XXX

The facility is subject to NSPS Subpart XXX. The permit condition includes requirements to install and operate the GCCS and flare within 30 months of the submittal of the first report in which the NMOC emission rate equals or exceeds the 34 Mg/yr threshold. The deadline for this action is January 27, 2021, and operation of these control devices prior to this date is considered voluntary. The landfill has already submitted the required design plan, which has been approved by DAQ, and the approved alternative operating parameters and procedures have been incorporated into the permit.

Finally, a testing requirement for the flare to demonstrate compliance with the criteria of 40 CFR 60.18 has been included. The initial performance test for the flare is required to be conducted, and the results submitted, no later than 180 days after the compliance date listed in the permit for the GCCS and flare to be in operation; this test report deadline is July 26, 2021. The permit condition includes a reporting requirement for the initial annual report to be submitted within 180 days of the compliance date for installation and startup of the GCCS to include the initial performance test report. Compliance is expected.

15A NCAC 02Q .0711: Emission Rates Requiring a Permit and

15A NCAC 02D .1100: Control of Toxic Air Pollutants

This modification resulted in an increase in toxic emissions from the facility. The potential volume emissions from the landfill surface (ID No. ES-1) were calculated using the methodology in AP-42 Chapter 2.4 (November 1998) and are based on a LFG generation rate of 28,189,079 m³/year in CY2023 as determined using LandGEM:

Parameter	Value
Waste Acceptance Rate (TPY)	Historical, plus 272,155 TPY projection
Methane Generation Rate (year ⁻¹)	0.040
Potential Methane Generation Capacity (m ³ /Mg)	100
NMOC Concentration (ppmv)	283.82 (From Tier 2)
Methane Content (%)	50
LFG Generation Rate (m ³ /yr)	28,189,079

The following example calculation is for the emission of hydrochloric acid (HCl) created from the combustion of the chlorine compounds in the landfill gas-fired flare. The best methods to estimate emission are mass balance methods using site specific data on total chloride [expressed in ppmv as the chloride ion (Cl⁻)]. [AP-42, Section 2.4.4.2 – Controlled Emissions]

- Flare design rating = 2,500 ft³/minute (or 70.8 m³/min = 4,248 m³/hour)
- Methane is only 50% of this gas stream (2,124 m³/hour)
- Q_{Cl⁻} = Emission rate of chloride ions, m³/hour
- C_{Cl⁻} = Concentration of chloride ions (42.0 ppmv, AP-42 default value)
- Multiplication factor for 50% methane concentration in landfill gas = 2.0
- Molecular weight of chloride ions = 35.45 g/gmole

$$Q_{Cl^-} = 2.0 \times Q_{CH_4} \times \left(\frac{C_{Cl^-}}{1 \times 10^6} \right) \text{ (AP-42, Equation 3)}$$

$$Q_{Cl^-} = 2.0 \times 2,124 \frac{m^3}{hour} \times \left(\frac{42.0 \text{ parts}}{1 \times 10^6} \right) = 0.18 \frac{m^3}{hour}$$

The mass of the pre-combustion chloride ions present in the methane were found using Equation 4 of AP-42, Section 2.4.4.2.

$$UM_{Cl^-} = 0.18 \frac{m^3}{hour} \times \left[\frac{35.45 \text{ g/gmol} \times 1 \text{ atm}}{8.205 \times 10^{-5} \frac{m^3 - atm}{gmol - K} \times 1000 \frac{g}{kg} \times (273 + 25^\circ C) K} \right] \times 2.2 \frac{pounds}{kg}$$

$$UM_{Cl^-} = 0.57 \frac{pounds}{hour}$$

To calculate the HCl produced from the chloride ions, Equation 10 of Section 2.4-8 was used.

$$\text{HCl}_{\text{emissions}} = \text{UM}_{\text{Cl}^-} \times \frac{\eta_{\text{col}}}{100} \times 1.03 \times \frac{\eta_{\text{cnt}}}{100}$$

Where:

UM_{Cl^-} = Uncontrolled mass emission of Cl^- ions

η_{col} = Collection efficiency of the landfill gas collection system, percent (100%)*

η_{cnt} = Control efficiency of the landfill gas control flare (100%)*

* To calculate worst-case HCl emissions, the facility assumes that 100% of the generated Cl^- ions are collected and converted to HCl rather than using the default collection and control efficiencies.

$$\text{HCl}_{\text{emissions}} = 0.57 \frac{\text{lb Cl}^-}{\text{hour}} \times \frac{100}{100} \times 1.03 \times \frac{100}{100} = 0.59 \frac{\text{lb HCl}}{\text{hour}}$$

The total emissions of other pollutants from the landfill and flare were calculated using AP-42 Section 2.4-6 Equation 5:

$$\text{CM}_p = \left[\text{UM}_p \times \left(1 - \frac{\eta_{\text{col}}}{100} \right) \right] + \left[\text{UM}_p \times \frac{\eta_{\text{col}}}{100} \times \left(1 - \frac{\eta_{\text{cnt}}}{100} \right) \right]$$

Where:

CM_p = Controlled mass emissions of pollutant

UM_p = Uncontrolled mass emission of pollutant

η_{col} = Collection efficiency of the landfill gas collection system, percent (75%)

η_{cnt} = Control efficiency of the landfill gas control flare
 (98% for halogenated species; 99.7% for non-halogenated species [AP-42])

Example calculation for toxic air pollutant benzene (lb/yr):

Projected emission rate, using Equations 3 & 4, from the landfill for benzene = 378.40 lb/year

$$\text{CM}_{\text{Benzene}} = \left[378.40 \frac{\text{lb}}{\text{yr}} \times \left(1 - \frac{75}{100} \right) \right] + \left[378.40 \frac{\text{lb}}{\text{yr}} \times \frac{75}{100} \times \left(1 - \frac{99.7}{100} \right) \right] = 95.45 \frac{\text{lb}}{\text{year}}$$

The facility provided calculations for flare emissions based on maximum flow rate through the flare, however the projected actual emissions were calculated using the LFG generation rate as estimated by LandGEM. The projected actual toxic air pollutant emissions through CY2023 and comparison to their respective TPERs from 02Q .0711(a) are as follows:

Toxic Air Pollutant	Averaging Period	Landfill Emissions	Flare Emissions	Total	TPER	Modeling Required?
1,1,1-Trichloroethane (methyl chloroform)	lb/day	0.11	0.012	0.12	250	No
	lb/hr	4.64×10^{-3}	4.89×10^{-4}	5.13×10^{-3}	64	No
1,1,2,2-Tetrachloroethane	lb/yr	118.14	12.48	130.62	430	No
1,1-Dichloroethene (vinylidene chloride)	lb/day	0.034	3.56×10^{-3}	0.038	2.5	No
1,2-Dibromoethane (ethylene dibromide)	lb/yr	0.12	3.45×10^{-5}	0.12	27	No
1,2-Dichloroethane (ethylene dichloride)	lb/yr	25.73	2.72	28.45	260	No
2-Butanone (MEK)	lb/day	0.89	0.014	0.90	78	No
	lb/hr	0.037	5.86×10^{-4}	0.038	22.4	No
4-Methyl-2-pentanone (MIBK)	lb/day	0.33	5.15×10^{-3}	0.34	52	No
	lb/hr	0.014	2.15×10^{-4}	0.014	7.6	No
Acrylonitrile	lb/day	0.58	9.24×10^{-3}	0.59	0.4	YES
	lb/hr	0.024	3.85×10^{-4}	0.024	0.22	No
Benzene	lb/yr	94.60	1.50	96.10	8.1	YES
Carbon disulfide	lb/day	0.077	1.22×10^{-3}	0.078	3.9	No
Carbon tetrachloride	lb/yr	0.39	0.041	0.43	460	No
Chlorobenzene	lb/day	0.049	5.16×10^{-3}	0.54	46	No
Chloroform	lb/yr	2.27	0.24	2.51	290	No
p-Dichlorobenzene	lb/hr	2.23×10^{-3}	2.36×10^{-4}	2.47×10^{-3}	16.8	No
Dichloromethane (methylene chloride)	lb/yr	770.19	81.33	851.52	1600	No
	lb/hr	0.088	9.28×10^{-3}	0.097	0.39	No
Ethyl mercaptan	lb/hr	0.010	1.62×10^{-4}	0.010	0.025	No
n-Hexane	lb/day	0.98	0.016	1.00	23	No
Hydrogen Chloride	lb/hr	-----	0.587	0.587	0.18	YES
Hydrogen Sulfide	lb/day	1.91	0.19	2.10	1.7	YES
Mercury (alkyl)	lb/day	1.02×10^{-4}	5.36×10^{-4}	6.38×10^{-4}	0.013	No
Mercury vapor	lb/day	-----	1.61×10^{-6}	1.61×10^{-6}	0.013	No
Methanethiol (methyl mercaptan)	lb/hr	8.67×10^{-3}	1.37×10^{-4}	8.81×10^{-3}	0.013	No
Tetrachloroethylene (Perchloroethylene)	lb/yr	392.21	41.42	433.63	13000	No
Toluene	lb/day	6.29	0.66	6.95	98	No
	lb/hr	0.26	0.028	0.29	14.4	No
Trichloroethylene	lb/yr	234.96	24.81	259.77	4000	No
Vinyl chloride	lb/yr	290.89	30.72	321.61	26	YES
Xylene	lb/day	2.23	0.035	2.27	57	No
	lb/hr	0.093	1.47×10^{-3}	0.094	16.4	No

The emission rates for acrylonitrile, benzene, hydrogen chloride, hydrogen sulfide, and vinyl chloride exceed their respective TPERs. The facility submitted a dispersion modeling analysis, which was reviewed by Nancy Jones, AQAB. The following impacts resulted from the modeling demonstration:

Toxic Air Pollutant	Averaging Period	Modeled Emission Rates		Concentration at Property Boundary ($\mu\text{g}/\text{m}^3$)	AAL ($\mu\text{g}/\text{m}^3$)	% AAL
		Landfill	Flare			
Acrylonitrile	lb/day	0.583	9.24×10^{-3}	0.59	30	2.0%
	lb/hr	0.024	3.85×10^{-4}	3.29	1000	0.3%
Benzene	lb/yr	94.60	1.50	0.042	0.12	35.1%
Hydrogen chloride	lb/hr	-----	0.587	1.76	700	0.3%
Hydrogen sulfide	lb/day	1.906	0.19	1.93	120	1.6%
Vinyl chloride	lb/yr	290.89	30.71	0.13	0.38	33.3%

This evaluation is valid through the next renewal in CY2023 and assumes that the waste placement rates in the application are not exceeded. Emissions of toxic air pollutants should be periodically re-evaluated. Since none of the toxic air pollutants evaluated exceed their respective TPERs or AALs, DAQ has determined that there is not an unacceptable risk to human health as a result of this modification.

15A NCAC 02Q :0504: Option for Obtaining a Construction and Operation Permit

The initial application was processed as the first step of a two-step significant modification under 15A NCAC 02Q .0501(b)(2). The GCCS and flare were first operated on May 15, 2019, and the landfill submitted the required notification and permit application within the required timeframes. This permit condition has been fulfilled and is no longer applicable, therefore it is being removed.

8. Other Regulatory Requirements

- A Zoning Consistency Determination was submitted with the Part I permit application (No. 6500343.18C). Benjamin Andrea, Planning and Zoning Supervisor of New Hanover County Planning and Land Use, determined that the proposed activity is consistent with applicable zoning ordinances.
- A P.E. Seal is required for this permit application. The application was sealed by David Greene, who is a registered Professional Engineer in the State of North Carolina (Seal #034464).
- The required permit application fee of \$970 was received by WiRO.

9. Emissions Review

Pollutant	Potential Emissions After Controls / Limitations (tons/yr)	Potential Emissions Before Controls / Limitations (tons/yr)
PM (TSP)	5.58	---
PM ₁₀	5.58	---
PM _{2.5}	5.58	---
SO ₂	21.00	---
NO _x	22.61	---
CO	103.06	---
VOC	3.75	12.33
Highest Individual HAP	2.58 (HCl)	4.59 (Toluene)
Total HAP	6.29	13.43

The facility's actual emissions as reported on the annual AQEI can be seen in the table on page one of this document.

MSW Landfill Emissions:

The potential volume emissions, before and after controls, from the landfill surface (ID No. ES-1) were calculated using the methodology in AP-42 Chapter 2.4 (November 1998) and are based on a peak LFG generation rate of 28,189,079 m³/year as determined using LandGEM, and default values for pollutant concentrations, VOC content, collection efficiency, and control efficiency. An example of these calculations is available in the air toxics review in Section 7.

Flare Emissions:

VOC emissions for the flare are based on the maximum capacity of the flare, regardless of LFG generation rate from the landfill, and assume a 98% control efficiency.

Particulate, NO_x, and CO emissions were calculated using the following emission factors:

NO_x: 0.068 lb/mmBtu (AP-42 13.5-1)

CO: 0.31 lb/mmBtu (AP-42 13.5-2)

PM: 17 lb/10⁶ ft³ CH₄ (AP-42 2.4-5)

The flare is rated for 75.9 mmBtu/hr at 1,250 ft³ CH₄ per minute (657 million ft³ CH₄ per year), with a heat value of 506 Btu per cubic foot of landfill gas.

Examples:

$$\frac{75.9 \text{ mmBtu}}{\text{hour}} \times \frac{0.068 \text{ lb NO}_x}{\text{mmBtu}} \times \frac{8,760 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 22.61 \frac{\text{tons NO}_x}{\text{year}}$$

$$\frac{75.9 \text{ mmBtu}}{\text{hour}} \times \frac{0.31 \text{ lb CO}}{\text{mmBtu}} \times \frac{8,760 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 103.06 \frac{\text{tons CO}}{\text{year}}$$

$$\frac{657 \text{ million ft}^3 \text{ CH}_4}{\text{year}} \times \frac{17 \text{ lb PM}}{\text{million ft}^3 \text{ CH}_4} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 5.58 \frac{\text{tons PM}}{\text{year}}$$

All particulate emissions from the combustion of landfill gas are considered as PM_{2.5}.

To calculate potential SO₂ emissions, AP-42 Chapter 2.4 was used along with information submitted by the facility in the application:

- Flare design rating = 2,500 ft³/minute (or 70.79 m³/min = 4,247 m³/hour)
- Methane is only 50% of this gas stream (2,123.5 m³/hour)
- Q_S = Emission rate of reduced sulfur compounds, m³/hour
- C_S = Concentration of reduced sulfur compounds (200 ppmv, as H₂S assumed by facility)
- Multiplication factor for 50% methane concentration in landfill gas = 2.0
- Molecular weight of sulfur = 32.06 g/mole

$$Q_S = 2.0 \times Q_{CH_4} \times \left(\frac{C_S}{1 \times 10^6} \right) \text{ (AP-42, Equation 3)}$$

$$Q_S = 2.0 \times 2,123.5 \frac{m^3}{hour} \times \left(\frac{200 \text{ parts}}{1 \times 10^6} \right) = 0.85 \frac{m^3}{hour}$$

The mass of the pre-combustion sulfur compounds present in the methane were found using Equation 4 of AP-42, Section 2.4.4.2.:

$$UM_S = 0.85 \frac{m^3}{hour} \times \left[\frac{32.06 \text{ g/gmol} \times 1 \text{ atm}}{8.205 \times 10^{-5} \frac{m^3 - atm}{gmol - K} \times 1000 \frac{g}{kg} \times (273 + 25^\circ C) K} \right] \times 2.2 \frac{pounds}{kg}$$

$$UM_S = 2.45 \frac{pounds}{hour}$$

To calculate SO₂ emitted from the combustion of sulfur, Equation 10 of Section 2.4-8 was used.

$$SO_2 \text{ emitted} = UM_S \times \frac{\eta_{col}}{100} \times 2.0$$

Where:

UM_S = Uncontrolled mass emission rate of sulfur compounds (2.45 lb sulfur/hour)

η_{col} = Collection efficiency of the landfill gas collection system, percent
 (assumed 100% by facility)

2.0 = Ratio of the molecular weight of SO₂ to the molecular weight of Sulfur

$$SO_2 \text{ emitted} = 2.45 \frac{lb}{hour} \times \frac{100}{100} \times 2.0 \times 8760 \frac{hours}{year} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 21.5 \frac{tons SO_2}{year}$$

AP-42 does not account for the destruction efficiency of the flare, however, when the nominally assumed 98% control efficiency is accounted for, the hourly emission rate of SO₂ is 4.79 lb/hr or 21 tons per year.

10. Source Testing Information

The facility is required to conduct an initial performance test on the flare (ID No. CD-1) and submit the results within 180 days of the compliance date of January 27, 2021 for operation of the GCCS and flare.

11. Statement of Compliance

The last compliance inspection was conducted by Linda Willis, of WiRO DAQ on November 13, 2019. The landfill was found to be operating in apparent compliance with their air quality permit at the time of the inspection. The facility was issued a Notice of Deficiency (NOD) on January 10, 2014 for late submittal of the Annual Compliance Certification and was issued another NOD on February 1, 2017 for late submittal of a semi-annual report.

12. Public Notice Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0525, the EPA will have a concurrent 45-day review period. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA.

The 30-day public notice period was from MONTH XX, 2020 through MONTH XX, 2020.

The EPA 45-day review period was from MONTH XX, 2020 through MONTH XX, 2020.

[Number of] comments were received during the public notice period and the EPA review period.

13. Comments and Recommendations

The Part 2 (15A NCAC 02Q .0501(b)(2)) Significant Permit Modification application for the New Hanover County Secure Landfill located in Wilmington, New Hanover County, NC has been reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined that this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources. The DAQ recommends the issuance of Air Permit No. 09805T07.